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later, in all sorts of subtle and unexpected ways, in the work of the school-room. As Emerson puts it: "There is a certain loftiness of thought and power to marshal and adjust particulars, which can only come from an insight of their whole connection."\*

Calvin Thomas

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## AN EXPERIMENT IN SCHEDULE MAKING

The admirable plan outlined by the Committee of Ten and their associates has not yet become a practical, living fact. This consummation may never be reached and certainly cannot be without the generous coöperation of all our leading universities. An account of an early attempt to make a working schedule along the lines laid down by the Committee, may be of interest to the readers of the SCHOOL REVIEW.

At the beginning of the second semester, January 29, 1894, Michigan Military academy adopted as many features of Table IV of the Committee's report as were practicable without interfering with the college preparation of the junior and senior classes. The increase in the number of subjects and the decrease in the periods per week in individual studies, at first caused some confusion, but eventually presented no greater objections than are incident to the same system in the universities.

In order to test the capabilities of the students, some were allowed to take twenty 45-minute periods of prepared work per week and none less than fifteen. Of the 37 who began with 20 p., 18 have carried the work successfully. The average number of periods at first was 17 1-2 and is now reduced to 16 1-2. During this experiment students have been allowed to drop studies when,

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\* The most brilliant book upon the history of German literature is Scherer's *Geschichte der deutschen Litteratur*, Berlin, 1883, translated by Mrs. Conybeare and published in two volumes by Charles Scribner's Sons, New York. A more serviceable work for the early stages of one's study is Königs *Deutsche Litteraturgeschichte*, Leipzig, 1881, which gives good analyses of the works discussed, covers the whole field down to the present time, and has a large number of helpful illustrations.

in the judgment of the faculty, the work has been too heavy to insure good results. The number of failures in the monthly reports has been 12 per cent. greater than during last term under the old system of 15 to 16 recitations of 55 minutes each. Considering the increased number of subjects, this shows no greater tendency to failure in individual studies. Our experience leads us to conclude that the average student cannot prepare more than sixteen lessons per week and that few should be allowed to attempt more than eighteen. On this basis we have arranged courses, giving every student substantially fifteen prepared lessons, two unprepared and three optional. Perfect regularity was not secured because so many requirements had to be met.

The courses are arranged primarily to prepare for the University of Michigan and Cornell university, but the optional studies are so arranged that it seems possible to give satisfactory preparation for Harvard, Yale, and Chicago. In order to meet the various requirements of these institutions substitutions are necessary. In the classical course botany and solid geometry required at the University of Michigan must give way to astronomy and Homer at Harvard. At least one modern language must be taught for Chicago, Harvard, and Yale. Homer, physical geography, and physiology are required for Cornell. Many other demands must be met in our programmes. In attacking this difficult problem we are animated by the common desire to make an advance in spite of difficulties and to provide a working schedule for our present needs. All such plans will necessarily contain blemishes and be expensive of time and teaching force as long as the present diversity of requirements for admission to college exists.

Numbers marked (\*) include one period of unprepared work. This is used for sight reading in foreign languages, composition in English, solution of problems and drawing in mathematics, experiments and mathematical work in physics. Students will be excused from studies printed in italics if the work is too heavy and the studies dropped are not required for college preparation.

The general advantages of these courses may be briefly noted. The decision between the classical and Latin scientific courses is postponed until the third year. The objection that some may raise to 10 p. of Greek when Homer is elected in the senior year

is fully met by the favorable results attained in the intensive study of languages at Morgan Park, the official preparatory school of the University of Chicago. In no case do two languages begin the same year. Latin, French and German may be taken four years each, as the German A and French A classes read different

Year	MODERN LANGUAGES	ENGLISH
I	German C, or French C... 4p English Literature, Com- position ..... *3p Elementary Algebra..... *5p Greek and Roman History 4p <i>Physical Geography</i> ..... 3p	Latin, or German C, or French C..... 5 or 4p English Literature and Composition ..... *2p Elementary Algebra..... *5p Greek and Roman History. 4p <i>Physical Geography</i> ..... 3p
II	German B, or French B.. 4p French C, or German C.. 4p Plane Geometry..... 3p Botany ..... 3p English Literature and Composition ..... 3p <i>Astronomy, or Geology</i> ... 3p	Latin, or German B, or French B..... *6 or 4p Astronomy and Geology... 3p Plane Geometry..... 3p Botany..... 3p English Literature and Composition ..... *4p <i>French History</i> ..... 3p
III	German A, or French A.. 3p French B, or German B.. 4p Rhetoric and English Literature ..... 3p Advanced Algebra and Geometry..... *5p English History..... 2p <i>Chemistry</i> ..... 3p	Latin, or German A, or French A..... *5 or 3p English History..... 4p Rhetoric and English Lit- erature ..... 3p Advanced Algebra and Geometry ..... *5p <i>Chemistry</i> ..... 3p
IV	French A, or German A.. 3p English Literature and Grammar..... 4p Physics..... *5p United States History... 2p Physiography, or Phys- iology ..... 3p <i>German A, or French A.</i> <i>Trigonometry and College</i> <i>Algebra</i> ..... 3p	Latin, or German A, or French A..... 5 or 3p English Literature and Grammar..... 4p Physics..... *5p United States History.... 2p Trigonometry and College Algebra ..... 3p <i>Physiology and Physiogra-  phy</i> ..... 3p <i>Law</i> ..... 3p

selections every year. Astronomy, chemistry, and physics come in the order recommended by the conference report, and physi-ology and physiography are placed in the senior year so as to receive more scientific treatment based on chemistry and physics. Physical geography in the first year is taught as an introduction

to physiography. American history is taught 3 p. per week in the preparatory year (eighth grade) with one period additional devoted to oral instruction in the outlines of ancient history. In the first year of the academy courses, Grecian history and Roman history to the fall of Rome are allowed 4 p. per week, thus en-

Year	CLASSICAL	LATIN-SCIENTIFIC
I	Latin ..... 5p English Literature and Composition ..... *3p Elementary Algebra..... *5p Greek and Roman History 4p <i>Physical Geography</i> ..... 3p	Latin..... 5P English Literature and Composition ..... *3p Elementary Algebra..... *5p Greek and Roman History 4p <i>Physical Geography</i> ..... 3p
II	Latin..... *6p English Literature and Composition ..... *4p Geometry, Plane..... 3p Botany ..... 3p <i>German C, or French C</i> .. 4p	Latin..... *6p <i>English Literature and Composition</i> ..... *4p Plane Geometry..... 3p Botany ..... 3p German C, or French C... 4p
III	Latin..... *5p Greek ..... 5p Rhetoric..... 1p Advanced Algebra and Geometry..... *5p <i>German B, or French B</i> .. 4p <i>Chemistry</i> ..... 3p	Latin..... *5p German B, or French B... 4p Rhetoric ..... 1p Advanced Algebra and Geometry..... *5p English History..... 2p <i>Astronomy or Geology</i> ... 3p <i>Chemistry</i> ..... 3p
IV	Latin ..... 5p Greek ..... *5p Grammar and Elementary English ..... 2p Physics or Homer..... *5p <i>German A, or French A</i> .. 3p <i>Trigonometry and College Algebra</i> ..... 3p	Latin..... 5p German A, or French A... 3p Grammar and Preparatory English ..... 2p Physics.. ..... *5p United States History... 2p <i>Physiology and Physiography</i> ..... 3p <i>Trigonometry and College Algebra</i> ..... 3p

abling the instructor to give a thorough training in ancient geography and develop to some extent the art side of the subject. In the English course, French history carries the student in the second year from the fall of Rome to the present time, following the general movements of mediæval and modern times in Europe.

In the third year English history (Gardiner) is given to all except classical students, with 2 p. additional constitutional history (Amos) in the English course. In the senior year a closer study of American history from 1829 to 1870 (Woodrow Wilson), is given in all courses except the classical. The German plan of studying the history of each country from two points of view at different periods in the course, is followed as far as possible. English work is so arranged as to include in the four years all the books required by the New England colleges. The study of American and English literature, with composition and the elementary parts of rhetoric, during the first two years, enables the student to master the technical parts of rhetoric in 1 p. per week of the third year, gaining practice in composition in the English history class of the same year. In the fourth year technical grammar is reviewed and advanced work is done in English literature. The senior course in law is Robinson's Elementary Law with special reference to Blackstone, a study which has proved valuable as a preparation for law schools and for business life. The unprepared lessons given to the class in elementary algebra are devoted to mathematical drawing with constant use of the metric system in measurement and in computation. All parts of algebra generally included in the elementary requirements for college are taken up topically the first year and reviewed with harder problems the third year. In the second year 3 p. per week are given to plane geometry with all except the hardest problems in Wentworth's geometry. Algebra and geometry are during the third year taught alternate days with one day additional for sight work in geometrical problems. By this method each subject adds interest to the other and the student gradually gains a mastery over the application of algebra to geometry, a mastery which is usually difficult to acquire. The trigonometry and college algebra of the senior year cover the requirements for admission at Cornell and Harvard. Students who do not take this course are given an opportunity to review geometry 1 p. per week in their senior year. With the exception of history, English, and algebra, as above noted, it does not seem advisable to give any study less than 3 p. per week because the lack of continuity seems detrimental to the student. In the science work it seems better to teach astronomy and geology alternate years 3 p. for the whole year and to pursue

the same plan with physiography and physiology. This gives time for a fair introduction to the science studied and assists in meeting the various requirements of the different universities.

Students preparing for the University of Michigan take the classical course to prepare for the A. B. course, Latin scientific course for Ph. B., modern language course for B. S., and English course for B. S. (C. E.) and B. L. In preparing for law schools, students take the English course with Latin, all courses in history and the senior course in law. In all preparation for Cornell, students take physical geography and physiology, omitting botany. For the A. B. course Homer takes the place of physics in the second term of the senior year; for the B. S., B. L., and engineering courses, the modern language and English courses give preparation by making substitutions. Preparation for Harvard may be secured by taking astronomy, Homer, French, and German, and omitting studies not required for admission. The English course may prepare for the Lawrence Scientific school. In preparing for Yale a student would take the classical course with Homer and two years of French or German in place of chemistry, botany, physics and solid geometry. The English course with two and one-half years of Latin and two years of French or German prepares for the Sheffield Scientific school. The requirements for the University of Chicago may be met in the classical course by omitting botany, electing French or German in the second and fourth years and by taking chemistry in the third year with additional laboratory work in place of the first term of physics and electing Homer in place of the second term of physics. Other combinations might easily be made in several instances.

The absolute requirement of certain sciences for admission to the universities seems to be the greatest obstacle in the way of a uniform and economical programme for preparatory schools. Harvard demands astronomy and elementary physics, or forty experiments in physics; Cornell insists on physical geography and physiology; the University of Michigan, with other state universities following her lead, accepts no substitute for botany and elementary physics. The University of Chicago virtually allows a choice between physics, chemistry, and biology, one year with laboratory work being required in the science chosen. If this option were allowed by all the universities for admission in the classical and

Latin scientific courses, with an additional year of science in other courses, the problem of schedule-making would be much simplified. This would enable a school with a good chemical laboratory and poorly equipped biological and physical laboratories to send boys to college well prepared in one science, with consequent benefit to the boys and to the universities. Again, a small school cannot afford special instructors in the three sciences and cannot find one instructor who will teach all the sciences with the best results. The expense of three laboratory outfits is a serious matter in many schools. If particular sciences have been made absolute requirements through the zeal and influence of the heads of strong departments or by friendly "log-rolling" in the university senate, is it not time to look at the question as one of national importance and not as a matter of policy on the part of a single university? With greater freedom in choosing sciences and consequently a simpler schedule, all preparatory schools could send their men to college with better preparation and their graduates would not be restricted to a few universities. Nearly all the schools can present additional work in French and German in the A. B. and Ph. B. courses without trouble or expense.

Should the University of Michigan drop botany from her absolute requirements and allow an option of biology, chemistry, or physics, and Cornell allow substitutes for physical geography and physiology, and Harvard accept geology in place of astronomy, and biology or chemistry in place of physics in her elementary requirements, a simpler, more economical, and more efficient programme might be adopted by all secondary schools preparing for the various universities and scientific schools. The model courses which will prepare best for college and render the secondary schools most efficient, will, like the constitution of the United States, be born of compromises and will be characterized by a "judicious mixture of definiteness of principle with elasticity in details."

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